H 5

```
   SSSSSSSSSSSS     OOOOOOOOO     RRRRRRRRRRRR     TTTTTTTTTTTTTTT     333333333        222222222
   SSSSSSSSSSSS     OOOOOOOOO     RRRRRRRRRRRR     TTTTTTTTTTTTTTT     333333333        222222222
   SSSSSSSSSSSS     OOOOOOOOO     RRRRRRRRRRRR     TTTTTTTTTTTTTTT     333333333        222222222
SSS              OOO         OOO  RRR         RRR        TTT        333         333  222         222
SSS              OOO         OOO  RRR         RRR        TTT        333         333  222         222
SSS              OOO         OOO  RRR         RRR        TTT        333         333  222         222
SSS              OOO         OOO  RRR         RRR        TTT                    333               222
SSS              OOO         OOO  RRR         RRR        TTT                    333               222
SSS              OOO         OOO  RRR         RRR        TTT                    333               222
   SSSSSSSSS     OOO         OOO  RRRRRRRRRRRR           TTT                 333              222
   SSSSSSSSS     OOO         OOO  RRRRRRRRRRRR           TTT                 333              222
   SSSSSSSSS     OOO         OOO  RRRRRRRRRRRR           TTT                 333              222
            SSS  OOO         OOO  RRR   RRR              TTT                    333        222
            SSS  OOO         OOO  RRR   RRR              TTT                    333        222
            SSS  OOO         OOO  RRR   RRR              TTT                    333        222
            SSS  OOO         OOO  RRR      RRR           TTT        333         333     222
            SSS  OOO         OOO  RRR      RRR           TTT        333         333     222
            SSS  OOO         OOO  RRR      RRR           TTT        333         333     222
SSSSSSSSSSSS        OOOOOOOOO     RRR         RRR        TTT           333333333     222222222222222
SSSSSSSSSSSS        OOOOOOOOO     RRR         RRR        TTT           333333333     222222222222222
SSSSSSSSSSSS        OOOOOOOOO     RRR         RRR        TTT           333333333     222222222222222
```

```
_$2

Pse
---
SOR

SOR

SOR

SOR

_LI
```

```
**FILE**ID**SORCOMPAR                                  I 5




  SSSSSSSS    OOOOOO    RRRRRRRR      CCCCCCCC    OOOOOO    MM      MM  PPPPPPPP      AAAAAA    RRRRRRRR
  SSSSSSSS    OOOOOO    RRRRRRRR      CCCCCCCC    OOOOOO    MM      MM  PPPPPPPP      AAAAAA    RRRRRRRR
SS          OO      OO  RR      RR  CC          OO      OO  MMMM  MMMM  PP      PP  AA      AA  RR      RR
SS          OO      OO  RR      RR  CC          OO      OO  MMMM  MMMM  PP      PP  AA      AA  RR      RR
SS          OO      OO  RR      RR  CC          OO      OO  MM  MM  MM  PP      PP  AA      AA  RR      RR
SS          OO      OO  RR      RR  CC          OO      OO  MM  MM  MM  PP      PP  AA      AA  RR      RR
  SSSSSS    OO      OO  RRRRRRRR    CC          OO      OO  MM      MM  PPPPPPPP    AA      AA  RRRRRRRR
  SSSSSS    OO      OO  RRRRRRRR    CC          OO      OO  MM      MM  PPPPPPPP    AA      AA  RRRRRRRR
        SS  OO      OO  RR  RR      CC          OO      OO  MM      MM  PP          AAAAAAAAAA  RR  RR
        SS  OO      OO  RR  RR      CC          OO      OO  MM      MM  PP          AAAAAAAAAA  RR  RR
        SS  OO      OO  RR    RR    CC          OO      OO  MM      MM  PP          AA      AA  RR    RR        ....
        SS  OO      OO  RR    RR    CC          OO      OO  MM      MM  PP          AA      AA  RR    RR        ....
SSSSSSSS      OOOOOO    RR      RR    CCCCCCCC    OOOOOO    MM      MM  PP          AA      AA  RR      RR      ....
SSSSSSSS      OOOOOO    RR      RR    CCCCCCCC    OOOOOO    MM      MM  PP          AA      AA  RR      RR      ....


LL            IIIIII      SSSSSSSS
LL            IIIIII      SSSSSSSS
LL              II      SS
LL              II      SS
LL              II      SS
LL              II      SS
LL              II        SSSSSS
LL              II        SSSSSS
LL              II              SS
LL              II              SS
LL              II              SS
LL              II              SS
LLLLLLLLLL    IIIIII    SSSSSSSS
LLLLLLLLLL    IIIIII    SSSSSSSS
```

```
SOR
Pse




PSE
---
.
SOR



Pha
---
Ini
Com
Pas
Sym
Pas
Sym
Pse
Cro
Ass

The
116
The
387
1 p



Mac
---
_$2

0 G

The

MAC
```

Table of contents

```
    (1)        3        Copyright Notice
    (1)       29        Program description
```

```
0000          .TITLE  SOR$COMPARE                 Compare data fields
0000          .IDENT  'V04-000'                   ; File: SORCOMPAR.MAR  Edit: PDG022
0000          .SBTTL  Copyright Notice
0000    ;
0000    ;****************************************************************************
0000    ;*                                                                          *
0000    ;*  COPYRIGHT (c) 1978, 1980, 1982, 1984 BY                                 *
0000    ;*  DIGITAL EQUIPMENT CORPORATION, MAYNARD, MASSACHUSETTS.                  *
0000    ;*  ALL RIGHTS RESERVED.                                                    *
0000    ;*                                                                          *
0000    ;*  THIS SOFTWARE IS FURNISHED UNDER A LICENSE AND MAY BE USED AND COPIED   *
0000    ;*  ONLY IN  ACCORDANCE WITH  THE  TERMS  OF  SUCH  LICENSE  AND WITH THE   *
0000    ;*  INCLUSION OF THE ABOVE COPYRIGHT NOTICE. THIS SOFTWARE OR  ANY  OTHER   *
0000    ;*  COPIES THEREOF MAY NOT BE PROVIDED OR OTHERWISE MADE AVAILABLE TO ANY   *
0000    ;*  OTHER PERSON.  NO TITLE TO AND OWNERSHIP OF  THE  SOFTWARE IS  HEREBY   *
0000    ;*  TRANSFERRED.                                                            *
0000    ;*                                                                          *
0000    ;*  THE INFORMATION IN THIS SOFTWARE IS  SUBJECT TO CHANGE WITHOUT NOTICE   *
0000    ;*  AND  SHOULD  NOT  BE  CONSTRUED AS  A COMMITMENT BY DIGITAL EQUIPMENT   *
0000    ;*  CORPORATION.                                                            *
0000    ;*                                                                          *
0000    ;*  DIGITAL ASSUMES NO RESPONSIBILITY FOR THE USE  OR  RELIABILITY OF ITS   *
0000    ;*  SOFTWARE ON EQUIPMENT WHICH IS NOT SUPPLIED BY DIGITAL.                 *
0000    ;*                                                                          *
0000    ;*                                                                          *
0000    ;****************************************************************************
0000    ;
```

```
0000            .SBTTL  Program description
0000    ;++
0000    ;
0000    ; FACILITY:
0000    ;
0000    ;       Compare data fields
0000    ;
0000    ; ABSTRACT:
0000    ;
0000    ;       NONE
0000    ;
0000    ; ENVIRONMENT:
0000    ;
0000    ;       Native mode, User mode, AST reentrant
0000    ;
0000    ; AUTHOR:
0000    ;
0000    ;       Peter D Gilbert, September 1982
0000    ;
0000    ; MODIFIED BY:
0000    ;
0000    ;       T03-016 PDG016  1-Sep-1982
0000    ;               Original
0000    ;       T03-017 Added SOR$$CONVERT.  PDG 21-Dec-1982
0000    ;       T03-018 Handle collating sequences.  PDG 22-Dec-1982
0000    ;       T03-019 Fetch (and decrement) the source length after the MOVC3 for NR.
0000    ;               PDG 29-Dec-1982
0000    ;       T03-020 New interface for collating sequences.  PDG 26-Jan-1983
0000    ;       T03-021 Add COM$B_PAD.  PDG 8-Feb-1983
0000    ;       T03-022 Modify interface for collating sequences.  PDG 7-Mar-1983
0000    ;--
```

```
    0000   ;+
    0000   ; Note that, due to the way registers R0-R3 are used as parameters in the
    0000   ; decimal instructions, LIB$FIXUP_DEC will be unable to repair the operands
    0000   ; in the case of a reserved operand fault.
    0000   ;
    0000   ; Note that lengths of passed parameters are given as DSC lengths
    0000   ; (i.e., number of bytes, except for packed decimal);
    0000   ; The hardware instructions work in digits.
    0000   ;-
    0000
    0000           .DSABL  GLOBAL
    0000
    0000           .EXTRN  COM$L_COLLATE    ; Offset from R11 of COM_COLLATE
    0000           .EXTRN  COM$B_PAD        ; Offset from R11 of COM_PAD
    0000
    0000           .EXTRN  SOR$_BAD_KEY
    0000           .EXTRN  LIB$AB_CVTTP_O
    0000           .EXTRN  LIB$AB_CVTTP_U
    0000           .EXTRN  LIB$AB_CVTTP_Z
    0000           .EXTRN  LIB$AB_CVTPT_O
    0000           .EXTRN  LIB$AB_CVTPT_U
    0000           .EXTRN  LIB$AB_CVTPT_Z
    0000           .EXTRN  LIB$AB_CVT_U_O
    0000
00000000           .PSECT  SOR$RO_CODE      NOVEC,NOWRT,RD,EXE,SHR,LCL,REL,CON,PIC,LONG
```

```
                          0000     ;
                          0000     ; Offsets from AP of the parameters
                          0000     ;
                 00000004 0000     DTYPE   = 4                             ; Datatype of keys
                 00000008 0000     FLD1    = 8                             ; Address of length/address of first field
                 0000000C 0000     FLD2    = 12                            ; Address of length/address of second field
                          0000
                     003C 0000             .ENTRY  SOR$$COMPARE, ^M<R2,R3,R4,R5>
                          0002             ;
                          0002             ; This routine compares two fields
                          0002             ;
                          0002             ; Fetch the descriptions into registers
                          0002             ;
            50  08 BC  7D 0002             MOVQ    @FLD1(AP), R0
            52  0C BC  7D 0006             MOVQ    @FLD2(AP), R2
                          000A             ;
                          000A             ; Case on the datatype
                          000A             ;
   25'8F    00  04 AC  8F 000A             CASEB   DTYPE(AP), #0, #<1$-0$-2>/2
                    0061' 0010     0$:     .WORD   Z       - 0$    ; 0
                    004C' 0012             .WORD   V       - 0$    ; 1
                    006B' 0014             .WORD   BU      - 0$    ; 2
                    0070' 0016             .WORD   WU      - 0$    ; 3
                    00A1' 0018             .WORD   LU      - 0$    ; 4
                    008C' 001A             .WORD   QU      - 0$    ; 5
                    00B3' 001C             .WORD   B       - 0$    ; 6
                    00B8' 001E             .WORD   W       - 0$    ; 7
                    00BD' 0020             .WORD   L       - 0$    ; 8
                    009A' 0022             .WORD   Q       - 0$    ; 9
                    00C2' 0024             .WORD   F       - 0$    ; 10
                    00C7' 0026             .WORD   D       - 0$    ; 11
                    004C' 0028             .WORD   FC      - 0$    ; 12
                    004C' 002A             .WORD   DC      - 0$    ; 13
                    0054' 002C             .WORD   T       - 0$    ; 14
                    0171' 002E             .WORD   NU      - 0$    ; 15
                    018F' 0030             .WORD   NL      - 0$    ; 16
                    00DF' 0032             .WORD   NLO     - 0$    ; 17
                    0132' 0034             .WORD   NR      - 0$    ; 18
                    01A7' 0036             .WORD   NRO     - 0$    ; 19
                    01C5' 0038             .WORD   NZ      - 0$    ; 20
                    00D8' 003A             .WORD   P       - 0$    ; 21
                    004C' 003C             .WORD   ZI      - 0$    ; 22
                    004C' 003E             .WORD   ZEM     - 0$    ; 23
                    004C' 0040             .WORD   DSC     - 0$    ; 24
                    0075' 0042             .WORD   OU      - 0$    ; 25
                    007E' 0044             .WORD   O       - 0$    ; 26
                    00CC' 0046             .WORD   G       - 0$    ; 27
                    00D2' 0048             .WORD   H       - 0$    ; 28
                    004C' 004A             .WORD   GC      - 0$    ; 29
                    004C' 004C             .WORD   HC      - 0$    ; 30
                    004C' 004E             .WORD   CIT     - 0$    ; 31
                    004C' 0050             .WORD   BPV     - 0$    ; 32
                    004C' 0052             .WORD   BLV     - 0$    ; 33
                    004C' 0054             .WORD   1$      - 0$    ; 34
                    009A' 0056             .WORD   ADT     - 0$    ; 35
                    004C' 0058             .WORD   1$      - 0$    ; 36
                    004C' 005A             .WORD   VT      - 0$    ; 37
```

```
                                  005C   144 1$: V: FC: DC: ZI: ZEM: DSC: GC: HC: CIT: BPV: BLV: VT:
        50   00000000'8F      D0  005C   145             MOVL     #SOR$_BAD_KEY, R0
                              04  0063   146             RET
        55   00000000'EB      D0  0064   147 T:          MOVL     COM$L_COLLATE(R11), R5
                         04   13  006B   148             BEQL     Z
                      00 B5   16  006D   149             JSB      @0(R5)
                              04  0070   150             RET
 63   52   0000'CB   61  50   2D  0071   151 Z:          CMPC5    R0, (R1), W^COM$B_PAD(R11), R2, (R3)
                         39   11  0079   152             BRB      CMPU
                     63  61   91  007B   153 BU:         CMPB     (R1), (R3)
                         34   11  007E   154             BRB      CMPU
                     63  61   B1  0080   155 WU:         CMPW     (R1), (R3)
                         2F   11  0083   156             BRB      CMPU
              0C A3   0C A1   D1  0085   157 OU:         CMPL     12(R1), 12(R3)
                         28   12  008A   158             BNEQ     CMPU
                         07   11  008C   159             BRB      O_1
              0C A3   0C A1   D1  008E   160 O:          CMPL     12(R1), 12(R3)
                         0E   12  0093   161             BNEQ     CMPS
              08 A3   08 A1   D1  0095   162 O_1:        CMPL     8(R1), 8(R3)
                         18   12  009A   163             BNEQ     CMPU
              04 A3   04 A1   D1  009C   164 QU:         CMPL     4(R1), 4(R3)
                         0E   13  00A1   165             BEQL     LU
                         16   19  00A3   166 CMPS:       BLSS     M1
                         18   14  00A5   167             BGTR     P1
                         50   D4  00A7   168             CLRL     R0
                              04  00A9   169             RET
              04 A3   04 A1   D1  00AA   170 ADT: Q:     CMPL     4(R1), 4(R3)     ; Note that ADT is considered to be signed
                         F2   12  00AF   171             BNEQ     CMPS
                     63  61   D1  00B1   172 LU:         CMPL     (R1), (R3)
                         05   1F  00B4   173 CMPU:       BLSSU    M1
                         07   1A  00B6   174             BGTRU    P1
                         50   D4  00B8   175             CLRL     R0
                              04  00BA   176             RET
                     50  01   CE  00BB   177 M1:         MNEGL    #1, R0
                              04  00BE   178             RET
                     50  01   D0  00BF   179 P1:         MOVL     #1, R0
                              04  00C2   180             RET
                     63  61   91  00C3   181 B:          CMPB     (R1), (R3)
                         DB   11  00C6   182             BRB      CMPS
                     63  61   B1  00C8   183 W:          CMPW     (R1), (R3)
                         D6   11  00CB   184             BRB      CMPS
                     63  61   D1  00CD   185 L:          CMPL     (R1), (R3)
                         D1   11  00D0   186             BRB      CMPS
                     63  61   51  00D2   187 F:          CMPF     (R1), (R3)
                         CC   11  00D5   188             BRB      CMPS
                     63  61   71  00D7   189 D:          CMPD     (R1), (R3)
                         C7   11  00DA   190             BRB      CMPS
                     63  61 51FD  00DC   191 G:          CMPG     (R1), (R3)
                         C1   11  00E0   192             BRB      CMPS
                     63  61 71FD  00E2   193 H:          CMPH     (R1), (R3)
                         BB   11  00E6   194             BRB      CMPS
        63   52      61  50   37  00E8   195 P:          CMPP4    R0, (R1), R2, (R3)
                         B4   11  00ED   196             BRB      CMPS
              5E     C0  AE   9E  00EF   197 NLO:        MOVAB    -64(SP), SP                     ; Make room on the stack
                     52  61   9A  00F3   198             MOVZBL   (R1), R2                        ; Fetch the overpuched byte
     7E      00000000'GF42    90  00F6   199             MOVB     G^LIB$AB_CVTTP_O[R2], -(SP)     ; Translate to packed
                     7E  01   90  00FE   200             MOVB     #1, -(SP)                       ; Make packed number non-zero
              03 AE    61    50    28  0101   201            MOVC3   R0, (R1), 3(SP)                      ; Move the string
        02 AE    02    6E    02    08  0106   202            CVTPS   #2, (SP), #2, 2(SP)                  ; Convert packed to separate
                       5E    02    C0  010C   203            ADDL2   #2, SP                               ; Pop the packed number
   20 AE    1F    6E    08 BC    09  010F   204            CVTSP   @FLD1(AP), (SP), #31, 32+00(SP)      ; Convert separate to packed
                 50    0C BC    7D  0116   205            MOVQ    @FLD2(AP), R0
                       52    61    9A  011A   206            MOVZBL  (R1), R2                             ; Fetch the overpuched byte
         7E     00000000'GF42    90  011D   207            MOVB    G^LIB$AB_CVTTP_O[R2], -(SP)          ; Translate to packed
                       7E    01    90  0125   208            MOVB    #1, -(SP)                            ; Make packed number non-zero
              03 AE    61    50    28  0128   209            MOVC3   R0, (R1), 3(SP)                      ; Move the string
        02 AE    02    6E    02    08  012D   210            CVTPS   #2, (SP), #2, 2(SP)                  ; Convert packed to separate
                       5E    02    C0  0133   211            ADDL2   #2, SP                               ; Pop the packed number
   30 AE    1F    6E    0C BC    09  0136   212            CVTSP   @FLD2(AP), (SP), #31, 32+16(SP)      ; Convert separate to packed
                       5E    20    C0  013D   213            ADDL2   #32, SP
                             37    11  0140   214            BRB     CMPP31
                 5E    C0 AE    9E  0142   215 NR:        MOVAB   -64(SP), SP
                             50    D7  0146   216            DECL    R0
                 6E    6140    90  0148   217            MOVB    (R1)[R0], (SP)
              01 AE    61    50    28  014C   218            MOVC3   R0, (R1), 1(SP)
              50    08 BC    01    A3  0151   219            SUBW3   #1, @FLD1(AP), R0
        20 AE    1F    6E    50    09  0156   220            CVTSP   R0, (SP), #31, 32+00(SP)
                 50    0C BC    7D  015C   221            MOVQ    @FLD2(AP), R0
                             50    D7  0160   222            DECL    R0
                 6E    6140    90  0162   223            MOVB    (R1)[R0], (SP)
              01 AE    61    50    28  0166   224            MOVC3   R0, (R1), 1(SP)
              50    08 BC    01    A3  016B   225            SUBW3   #1, @FLD1(AP), R0
        30 AE    1F    6E    50    09  0170   226            CVTSP   R0, (SP), #31, 32+16(SP)
                       5E    20    C0  0176   227            ADDL2   #32, SP
                                       0179   228 ;          BRB     CMPP31
              10 AE    6E    1F    35  0179   229 CMPP31:    CMPP3   #31, (SP), 16(SP)
                           FF22    31  017E   230            BRW     CMPS
                       5E    20    C2  0181   231 NU:        SUBL2   #32, SP
 1F     00000000'GF    61    50    26  0184   232            CVTTP   R0, (R1), G^LIB$AB_CVTTP_U, #31, 00(SP)
                             6E        018D
                 50    0C BC    7D  018E   233            MOVQ    @FLD2(AP), R0
 1F     00000000'GF    61    50    26  0192   234            CVTTP   R0, (R1), G^LIB$AB_CVTTP_U, #31, 16(SP)
                          10 AE        019B
                             DA    11  019D   235            BRB     CMPP31
                       5E    20    C2  019F   236 NL:        SUBL2   #32, SP
                             50    D7  01A2   237            DECL    R0
           6E    1F    61    50    09  01A4   238            CVTSP   R0, (R1), #31, 00(SP)
                 50    0C BC    7D  01A9   239            MOVQ    @FLD2(AP), R0
                             50    D7  01AD   240            DECL    R0
        10 AE    1F    61    50    09  01AF   241            CVTSP   R0, (R1), #31, 16(SP)
                             C2    11  01B5   242            BRB     CMPP31
                       5E    20    C2  01B7   243 NRO:       SUBL2   #32, SP
 1F     00000000'GF    61    50    26  01BA   244            CVTTP   R0, (R1), G^LIB$AB_CVTTP_O, #31, 00(SP)
                             6E        01C3
                 50    0C BC    7D  01C4   245            MOVQ    @FLD2(AP), R0
 1F     00000000'GF    61    50    26  01C8   246            CVTTP   R0, (R1), G^LIB$AB_CVTTP_O, #31, 16(SP)
                          10 AE        01D1
                             A4    11  01D3   247            BRB     CMPP31
                       5E    20    C2  01D5   248 NZ:        SUBL2   #32, SP
 1F     00000000'GF    61    50    26  01D8   249            CVTTP   R0, (R1), G^LIB$AB_CVTTP_Z, #31, 00(SP)
                             6E        01E1
                 50    0C BC    7D  01E2   250            MOVQ    @FLD2(AP), R0
 1F     00000000'GF    61    50    26  01E6   251            CVTTP   R0, (R1), G^LIB$AB_CVTTP_Z, #31, 16(SP)
                          10 AE        01EF
```

```
                            86   11  01F1   252        BRB      CMPP31
```

```
                                        01F3
                                        01F3  ; Offsets from AP of the parameters
                                        01F3  ;
                             00000004   01F3  DTYPE   = 4                           ; Datatype of keys
                             00000008   01F3  FLD1    = 8                           ; Address of length/address of constant
                             0000000C   01F3  FLD2    = 12                          ; Address of length/address of field
                                        01F3
                                 007C   01F3          .ENTRY  SOR$$CONVERT, ^M<R2,R3,R4,R5,R6>
                                        01F5          ;
                                        01F5          ; This routine converts a decimal string constant to an appropriate
                                        01F5          ; datatype.
                                        01F5          ;
                    50    08 BC    7D   01F5          MOVQ    @FLD1(AP), R0
                       5E    10    C2   01F9          SUBL2   #16, SP
                                        01FC          ;
                                        01FC          ; First, convert the number to packed
                                        01FC          ;
   1F    00000000'GF    61    50   26   01FC          CVTTP   R0, (R1), G^LIB$AB_CVTTP_U, #31, (SP)
                              6E        0205
                                        0206          ;
                                        0206          ; Now case on the destination datatype
                                        0206          ;
                    52    0C BC    7D   0206          MOVQ    @FLD2(AP), R2
          25'8F     00    04 AC    8F   020A          CASEB   DTYPE(AP), #0, #<1$-0$-2>/2
                              005A'     0210  0$:     .WORD   vZ      - 0$      ; 0
                              004C'     0212          .WORD   vV      - 0$      ; 1
                              005A'     0214          .WORD   vBU     - 0$      ; 2
                              005A'     0216          .WORD   vWU     - 0$      ; 3
                              005A'     0218          .WORD   vLU     - 0$      ; 4
                              005A'     021A          .WORD   vQU     - 0$      ; 5
                              005A'     021C          .WORD   vB      - 0$      ; 6
                              005A'     021E          .WORD   vW      - 0$      ; 7
                              005A'     0220          .WORD   vL      - 0$      ; 8
                              005A'     0222          .WORD   vQ      - 0$      ; 9
                              0119'     0224          .WORD   vF      - 0$      ; 10
                              014F'     0226          .WORD   vD      - 0$      ; 11
                              004C'     0228          .WORD   vFC     - 0$      ; 12
                              004C'     022A          .WORD   vDC     - 0$      ; 13
                              005A'     022C          .WORD   vvT     - 0$      ; 14
                              00AA'     022E          .WORD   vNU     - 0$      ; 15
                              00B6'     0230          .WORD   vNL     - 0$      ; 16
                              00BF'     0232          .WORD   vNLO    - 0$      ; 17
                              00DE'     0234          .WORD   vNR     - 0$      ; 18
                              00F6'     0236          .WORD   vNRO    - 0$      ; 19
                              0102'     0238          .WORD   vNZ     - 0$      ; 20
                              010E'     023A          .WORD   vP      - 0$      ; 21
                              004C'     023C          .WORD   vZI     - 0$      ; 22
                              004C'     023E          .WORD   vZEM    - 0$      ; 23
                              004C'     0240          .WORD   vDSC    - 0$      ; 24
                              005A'     0242          .WORD   vOU     - 0$      ; 25
                              005A'     0244          .WORD   vO      - 0$      ; 26
                              0189'     0246          .WORD   vG      - 0$      ; 27
                              01C7'     0248          .WORD   vH      - 0$      ; 28
                              004C'     024A          .WORD   vGC     - 0$      ; 29
                              004C'     024C          .WORD   vHC     - 0$      ; 30
                              004C'     024E          .WORD   vCIT    - 0$      ; 31
                              004C'     0250          .WORD   vBPV    - 0$      ; 32
```

```
                          004C'  0252   310             .WORD   vBLV    - 0$    ; 33
                          004C'  0254   311             .WORD   1$      - 0$    ; 34
                          005A'  0256   312             .WORD   vADT    - 0$    ; 35
                          004C'  0258   313             .WORD   1$      - 0$    ; 36
                          004C'  025A   314             .WORD   vvVT    - 0$    ; 37
                                 025C   315 1$: vV: vFC: vDC: vZI: vZEM: vDSC: vGC: vHC: vCIT: vBPV: vBLV: vvVT:
            50    00000000'8F  D0  025C   316             MOVL    #SOR$_BAD_KEY, R0
                               04  0263   317             RET
              6C 29 67 49 29 04   0264   318 TWO_32: .PACKED 4294967296                  ; 2**32
                                 026A   319 vZ: vvT: vBU: vWU: vLU: vQU: vB: vW: vL: vQ: vOU: vO: vADT:
                    5E   20    C2  026A   320             SUBL2   #32, SP
                         56    D4  026D   321             CLRL    R6
                         0D    11  026F   322             BRB     20$
               52    0C  AC    D0  0271   323 10$:        MOVL    FLD2(AP), R2
           52    56    04  A2  C1  0275   324             ADDL3   4(R2), R6, R2
                   FC  A2  50  D0  027A   325             MOVL    R0, -4(R2)
 1F    20 AE    1F    E2 AF  0A    27  027E   326 20$:        DIVP    #10, TWO_32, #31, 32(SP), #31, 16(SP)
                       10 AE       0286
 1F    10 AE    1F    D8 AF  0A    25  0288   327             MULP    #10, TWO_32, #31, 16(SP), #31, 00(SP)
                             6E       0290
       20 AE    1F    6E  1F   22  0291   328             SUBP4   #31, 00(SP), #31, 32(SP)
             50    20 AE  1F   36  0297   329             CVTPL   #31, 32(SP), R0
       FFCE 56    04    0C BC  3D  029C   330             ACBW    @FLD2(AP), #4, R6, 10$
             52    0C  BC      7D  02A3   331             MOVQ    @FLD2(AP), R2
                    52    56   A2  02A7   332             SUBW2   R6, R2
                    52    04   C0  02AA   333             ADDL2   #4, R2
              52    52    03   78  02AD   334             ASHL    #3, R2, R2
      FC A346    52    00  50  F0  02B1   335             INSV    R0, #0, R2, -4(R3)[R6]
                          6B   11  02B8   336             BRB     JOIN
  52   00000000'GF    6E  1F   24  02BA   337 vNU:        CVTPT   #31, (SP), G^LIB$AB_CVTPT_U, R2, (R3)
                          63       02C3
                          5F   11  02C4   338             BRB     JOIN
                          52   D7  02C6   339 vNL:        DECL    R2
         63    52    6E   1F   08  02C8   340             CVTPS   #31, (SP), R2, (R3)
                          56   11  02CD   341             BRB     JOIN
          54    FFFFFFD0'GF    9E  02CF   342 vNLO:       MOVAB   G^LIB$AB_CVT_U_O-^A/0/, R4
  52   00000000'GF    6E  1F   24  02D6   343             CVTPT   #31, (SP), G^LIB$AB_CVTPT_U, R2, (R3)
                          63       02DF
                          03   18  02E0   344             BGEQ    1$
                    54    0A   C0  02E2   345             ADDL2   #10, R4
                    50    63   9A  02E5   346 1$:         MOVZBL  (R3), R0
               63     6440     90  02E8   347             MOVB    (R4)[R0], (R3)
                          37   11  02EC   348             BRB     JOIN
                          52   D7  02EE   349 vNR:        DECL    R2
         63    52    6E   1F   08  02F0   350             CVTPS   #31, (SP), R2, (R3)
             52    0C  BC      7D  02F5   351             MOVQ    @FLD2(AP), R2
              50    52    01   C3  02F9   352             SUBL3   #1, R2, R0
  63    52    63    01 A3  50  2C  02FD   353             MOVC5   R0, 1(R3), (R3), R2, (R3)
                          1F   11  0304   354             BRB     JOIN
  52   00000000'GF    6E  1F   24  0306   355 vNRO:       CVTPT   #31, (SP), G^LIB$AB_CVTPT_O, R2, (R3)
                          63       030F
                          13   11  0310   356             BRB     JOIN
  52   00000000'GF    6E  1F   24  0312   357 vNZ:        CVTPT   #31, (SP), G^LIB$AB_CVTPT_Z, R2, (R3)
                          63       031B
                          07   11  031C   358             BRB     JOIN
  63    52    00    6E    1F   00  F8  031E   359 vP:         ASHP    #0, #31, (SP), #0, R2, (R3)
                                 0325   360 ;           BRB     JOIN
      50   01   D0  0325  JOIN:   MOVL     #1, R0
                04  0328          RET
                    0329
                    0329          .MACRO   CVTPF    X
                    0329          CLRB     -(SP)
                    0329          CLR'X    (R4)
                    0329          MOVL     #3, R6
                    0329  10$:    MOVB     4(SP), -(SP)
                    0329          CVTPL    #9, 1(SP), 1(SP)
                    0329          MOVB     (SP)+, 4(SP)
                    0329          CVTL'X   (SP)+, R0
                    0329          MUL'X'2 #100000000, (R4)          ; Multiply by 10**8
                    0329          ADD'X'2 R0, (R4)
                    0329          SOBGEQ   R6, 10$
                    0329          EXTZV    #0, #8, (SP), R0
                    0329          BBC      R0, I^#^B101000, 20$
                    0329          MNEG'X   (R4), (R4)
                    0329  20$:    MOVL     #1, R0
                    0329          RET
                    0329          .ENDM
                    0329
                    0329  vF:     CVTPF    F
                    035F  vD:     CVTPF    D
                    0399  vG:     CVTPF    G
                    03D7  vH:     CVTPF    H
                    041E
                    041E          .END
```

```
ADT                   000000AA R       01          VBU                 0000026A R      01
B                     000000C3 R       01          VCIT                0000025C R      01
BLV                   0000005C R       01          VD                  0000035F R      01
BPV                   0000005C R       01          VDC                 0000025C R      01
BU                    0000007B R       01          VDSC                0000025C R      01
CIT                   0000005C R       01          VF                  00000329 R      01
CMPP31                00000179 R       01          VFC                 0000025C R      01
CMPS                  000000A3 R       01          VG                  00000399 R      01
CMPU                  000000B4 R       01          VGC                 0000025C R      01
COM$B_PAD             ********     X   00          VH                  000003D7 R      01
COM$L_COLLATE         ********     X   00          VHC                 0000025C R      01
D                     000000D7 R       01          VL                  0000026A R      01
DC                    0000005C R       01          VLU                 0000026A R      01
DSC                   0000005C R       01          VNL                 000002C6 R      01
DTYPE               = 00000004                     VNLO                000002CF R      01
F                     000000D2 R       01          VNR                 000002EE R      01
FC                    0000005C R       01          VNRO                00000306 R      01
FLD1                = 00000008                     VNU                 000002BA R      01
FLD2                = 0000000C                     VNZ                 00000312 R      01
G                     000000DC R       01          VO                  0000026A R      01
GC                    0000005C R       01          VOU                 0000026A R      01
H                     000000E2 R       01          VP                  0000031E R      01
HC                    0000005C R       01          VQ                  0000026A R      01
JOIN                  00000325 R       01          VQU                 0000026A R      01
L                     000000CD R       01          VT                  0000005C R      01
LIB$AB_CVTPT_O        ********     X   00          VV                  0000025C R      01
LIB$AB_CVTPT_U        ********     X   00          VVT                 0000026A R      01
LIB$AB_CVTPT_Z        ********     X   00          VVVT                0000025C R      01
LIB$AB_CVTTP_O        ********     X   00          VW                  0000026A R      01
LIB$AB_CVTTP_U        ********     X   00          VWU                 0000026A R      01
LIB$AB_CVTTP_Z        ********     X   00          VZ                  0000026A R      01
LIB$AB_CVT_U_O        ********     X   00          VZEM                0000025C R      01
LU                    000000B1 R       01          VZI                 0000025C R      01
M1                    000000BB R       01          W                   000000C8 R      01
NL                    0000019F R       01          WU                  00000080 R      01
NLO                   000000EF R       01          Z                   00000071 R      01
NR                    00000142 R       01          ZEM                 0000005C R      01
NRO                   000001B7 R       01          ZI                  0000005C R      01
NU                    00000181 R       01
NZ                    000001D5 R       01
O                     0000008E R       01
OU                    00000085 R       01
O_1                   00000095 R       01
P                     000000E8 R       01
P1                    000000BF R       01
Q                     000000AA R       01
QU                    0000009C R       01
SOR$$COMPARE          00000000 RG      01
SOR$$CONVERT          000001F3 RG      01
SOR$_BAD_KEY          ********     X   00
T                     00000064 R       01
TWO_32                00000264 R       01
V                     0000005C R       01
VADT                  0000026A R       01
VB                    0000026A R       01
VBLV                  0000025C R       01
VBPV                  0000025C R       01
```

```
                                           +----------------+
                                           ! Psect synopsis !
                                           +----------------+

PSECT name                   Allocation          PSECT No.  Attributes
----------                   ----------          ---------  ----------
.  ABS  .                    00000000  (    0.)  00 (  0.)  NOPIC    USR    CON    ABS    LCL NOSHR NOEXE NORD   NOWRT NOVEC BYTE
SOR$RO_CODE                  0000041E  ( 1054.)  01 (  1.)    PIC    USR    CON    REL    LCL   SHR   EXE   RD   NOWRT NOVEC LONG

                                        +------------------------+
                                        ! Performance indicators !
                                        +------------------------+

Phase                    Page faults    CPU Time       Elapsed Time
-----                    -----------    --------       ------------
Initialization                    31    00:00:00.04    00:00:01.66
Command processing               118    00:00:00.42    00:00:04.29
Pass 1                           106    00:00:01.70    00:00:06.60
Symbol table sort                  0    00:00:00.09    00:00:00.09
Pass 2                            80    00:00:00.82    00:00:03.02
Symbol table output                9    00:00:00.08    00:00:00.08
Psect synopsis output              3    00:00:00.01    00:00:00.01
Cross-reference output             0    00:00:00.00    00:00:00.00
Assembler run totals             349    00:00:03.17    00:00:15.76

The working set limit was 1050 pages.
11603 bytes (23 pages) of virtual memory were used to buffer the intermediate code.
There were 10 pages of symbol table space allocated to hold 95 non-local and 15 local symbols.
387 source lines were read in Pass 1, producing 17 object records in Pass 2.
1 page of virtual memory was used to define 1 macro.

                                       +----------------------------+
                                       ! Macro library statistics !
                                       +----------------------------+

Macro library name                       Macros defined
------------------                       --------------
_$255$DUA28:[SYSLIB]STARLET.MLB;2                 0

0 GETS were required to define 0 macros.

There were no errors, warnings or information messages.

MACRO/DISABLE=TRACE/LIS=LIS$:SORCOMPAR/OBJ=OBJ$:SORCOMPAR MSRC$:SORCOMPAR/UPDATE=(ENH$:SORCOMPAR)
```

0364 AH-BT13A-SE
VAX/VMS V4.0

DIGITAL EQUIPMENT CORPORATION
CONFIDENTIAL AND PROPRIETARY